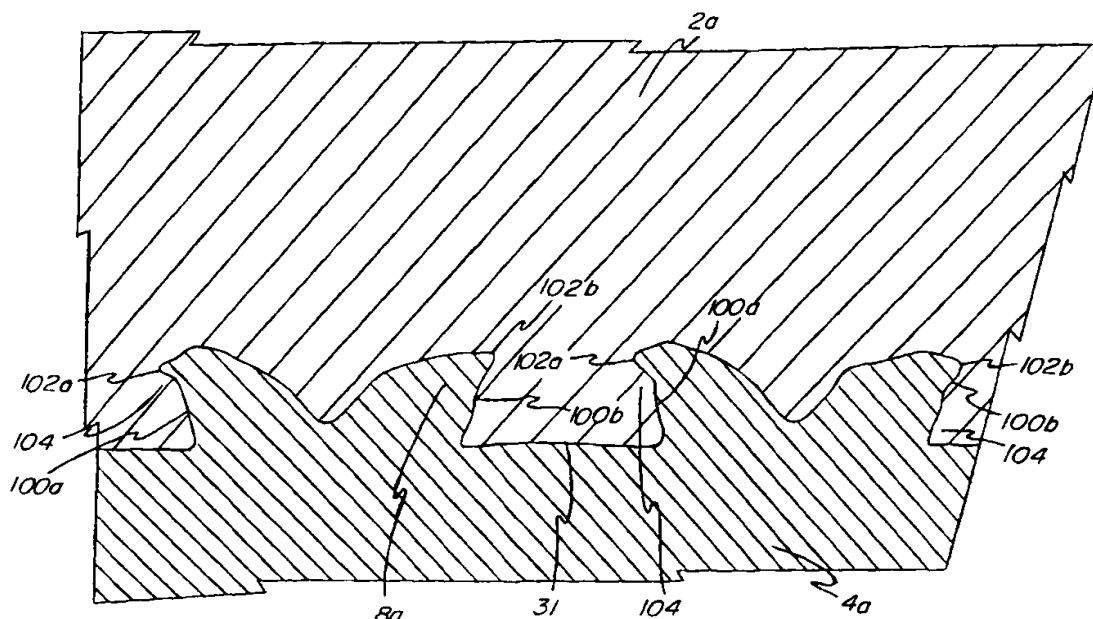




## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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(75) Inventors/Applicants (for US only): IVANOV, Eugene, Y. [US/US]; 3198 Windsor Place, Grove City, OH 43123 (US). CONARD, Harry, W. [US/US]; 7493 Harrisburg London Road, Orient, OH 43146 (US).			
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(54) Title: LOW TEMPERATURE SPUTTER TARGET BONDING METHOD AND TARGET ASSEMBLIES PRODUCED THEREBY



## (57) Abstract

A low temperature target and backing plate bonding process and assemblies made thereby. A plurality of projections are formed in the harder member of the assembly. The assembly is bonded by conventional techniques around the peripheral assembly boundaries. The assembly is then pressure consolidated at low temperature so that the projections, circumscribed by the bonded zone, penetrate into the softer member promoting the formation of metal to metal cold diffusion type bonds.

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## INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US99/19869

## A. CLASSIFICATION OF SUBJECT MATTER

IPC(6) : C23C 14/34; B23K 31/00

US CL : 204/198.12; 228/114.5, 164

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 204/198.12; 228/114.5, 164

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

West Database

search terms: sputtering target, backing plate, copper target, e beam, electronic beam, energy beam, bond, groove

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5,342,496 A (STELLRECHT) 30 August 1994, claims 1, 4, 5, 13, 14 and 15, column 3, lines 4-14, column 5, lines 6-20, figure 3.	1,2,6,8,9, 12-22, 24, 27, 28
X	US 4,652,358 A (DEPPISCH et al.) 24 March 1987, claims 1 and 2.	1, 4, 27
X ----- Y	US 5,230,459 A (MUELLER et al.) 27 July 1993, figures 1, 2, and 5, column 3, lines 34-43, column 4, lines 5-15, column 6, lines 35-46, column 6, lines 60-66, column 8, lines 5-10.	28-30, 32, 33 ----- 8, 9, 27
X ----- Y	US 5,009,765 A (QAMAR et al.) 23 April 1991, figure 3, column 4, lines 1-24, column 2, lines 22-31 and lines 57-62. column 6, lines 1-3 and lines 25-26.	1, 2, 7, 9 ----- 5, 24, 25, 27, 29

☒ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

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Date of the actual completion of the international search

08 NOVEMBER 1999


Date of mailing of the international search report

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## INTERNATIONAL SEARCH REPORT

 International application No.  
 PCT/US99/19869

## C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X,P ----- Y,P	US 5,836,506 A (HUNT et al.) 17 November 1998, column 3, lines 17-24, column 8, lines 17-39, column 1, lines 6-7, column 4, lines 16-35. column 11 lines 31-34, column 12, lines 1-32.	18, 22 ----- 13, 27
Y	JP 06081142 A (MITSUBISHI) 31 August 1992 abstract.	4, 11, 26
Y,P	US 5,879,524 A (HURWITT et al.) 09 March 1999, column 1, lines 25-47, column 3, lines 59-64.	8, 9, 14, 19
Y	US 5,397,050 A (MUELLER) 14 March 1995, column 1, lines 30-42.	5, 8, 9
Y	US 5,653,856 A (IVANOV et al.) 05 August 1997, column 1, lines 11-15, column 2, lines 4-15.	8, 9, 27
Y	US 5,593,082 A (IVANOV et al.) 14 January 1997, column 1, lines 8-11, column 2, lines 1-12.	8, 9, 27
Y	US 5,803,342 A (KARDOKUS) 08 September 1998, column 1, lines 5-8.	10, 23, 31
Y	US 4,968,665 A (OHUCHI et al.) 06 November 1990, column 9, lines 40-48.	10, 23, 31
Y	US 5,693,203 A (OHHASHI et al.) 02 December 1997, column 1, lines 25-44, column 4, lines 61-67, column 5, lines 1-4 and 63-67, column 8, lines 29-50. See also claims 1 and 2.	5, 8, 9, 14, 25, 27, 29
Y	JP 02043362 A (HITACHI) 13 February 1990, abstract.	28
A	US 5,415,754 A (MANLEY) 16 May 1995.	
A	US 5,676,803 A (DEMARAY et al.) 14 October 1997.	

# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US99/19869

## Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This international report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:
  
2. ☒ Claims Nos.: 3  
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:  
  
Claim 3 refers to and sequences a step (d) not claimed or explained.
  
3. ☒ Claims Nos.: 3  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

## Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
  
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.  
☐ No protest accompanied the payment of additional search fees.

## PATENT COOPERATION TREATY

PCT

## NOTIFICATION OF ELECTION

(PCT Rule 61.2)

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<b>Date of mailing</b> (day/month/year) 13 June 2000 (13.06.00)	
<b>International application No.</b> PCT/US99/19869	<b>Applicant's or agent's file reference</b> TSO 167 P2-P
<b>International filing date</b> (day/month/year) 27 August 1999 (27.08.99)	<b>Priority date</b> (day/month/year) 11 September 1998 (11.09.98)
<b>Applicant</b> IVANOV, Eugene, Y. et al	

1. The designated Office is hereby notified of its election made:



in the demand filed with the International Preliminary Examining Authority on:

21 March 2000 (21.03.00)



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